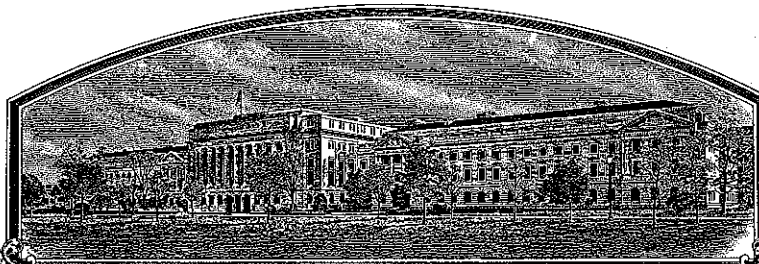


No.

200500181



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Michigan State University and
United States Department of Agriculture

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture


AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLACEMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR PROPAGATING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBERS AND GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BEAN, FIELD

'Merlot'

*In Testimony Whereof, I have hereunto set my hand
and caused the seal of the Plant Variety
Protection Office to be affixed at the City of
Washington, D.C. this seventeenth day of March,
in the year two thousand and six.*

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture



U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

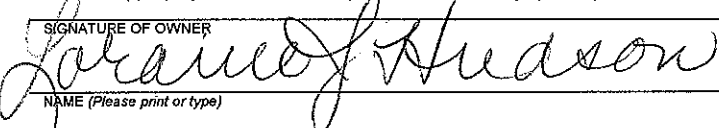
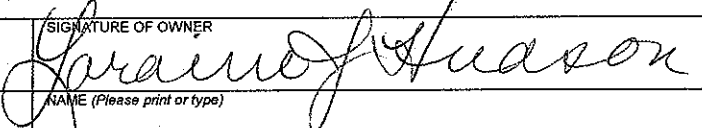
Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Michigan State University and United States Department of Agriculture		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME R98026	3. VARIETY NAME Merlot
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) Director, Office of Intellectual Property Michigan State University 246 Administration Bldg. East Lansing, MI 48824		5. TELEPHONE (include area code) (517) 355-2186	FOR OFFICIAL USE ONLY PVPO NUMBER 2005 00181 FILING DATE March 15, 2005
		6. FAX (include area code) (517) 432-3880	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Land Grant University	8. IF INCORPORATED, GIVE STATE OF INCORPORATION	9. DATE OF INCORPORATION	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Michigan State University Office of Intellectual Property 246 Administration Bldg. East Lansing, MI 48824		FILING AND EXAMINATION FEES: \$ 3652.00 DATE 3/3/2005 CERTIFICATION FEE: \$ 768.00 DATE MARCH 2, 2006	
11. TELEPHONE (Include area code) (517) 355-2186	12. FAX (Include area code) (517) 432-3880	13. E-MAIL	
14. CROP KIND (Common Name) small-red bean	16. FAMILY NAME (Botanical) Fabaceae	18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION.	
15. GENUS AND SPECIES NAME OF CROP Phaseolus vulgaris L.	17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) <input checked="" type="checkbox"/> YES (If "yes", answer items 21 and 22 below) <input type="checkbox"/> NO (If "no", go to item 23)	
19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input type="checkbox"/> Filing and Examination Fee (\$3,652), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input checked="" type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED	
23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input checked="" type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)	
24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)			

25. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER 		SIGNATURE OF OWNER 	
NAME (Please print or type) Loraine J. Hudson		NAME (Please print or type) Loraine J. Hudson	
CAPACITY OR TITLE Director	DATE 2/8/05	CAPACITY OR TITLE Director	DATE 2/8/05

INSTRUCTIONS

200500181

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filing fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. **Retain one copy for your files.** All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvpindex.htm>

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 <http://www.ams.usda.gov/lsg/seed.htm>.

ITEM

- 19a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
20. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
23. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

22. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

Foundation class seed multiplication is limited to five (5) generations. Certified seed multiplication is limited to one (1) generation.

23. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

Certified class seed of Merlot is scheduled for first sale in May, 2005.

24. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Release of Merlot Small Red Bean Variety

A number of issues delayed the final licensing and commercialization of the Merlot variety. The variety release process was initiated through the different variety release committees at Michigan State University during the Spring 2002.

1. The variety Merlot originated from USDA-ARS in collaboration with Michigan State University. Since USDA-ARS was the lead developer, considerable time elapsed prior to final approval and release by USDA after the decision to release the variety was made by MSU variety release committees in 2002. This resulted in delays to increase and establish breeder seed of Merlot in 2002.
2. When the decision to move forward on the seed multiplication was eventually made only a small amount of breeder seed was available. This seed was sent to New Zealand during the winter of 2002. That seed increase was a failure which meant that renewed attempts to increase foundation seed of Merlot had to be started again in the US in the summer of 2003. Seed quantities were limited.
3. In 2004 certified seed was produced in the US and was available for sale as certified seed to commercial growers in the spring of 2005 – date March 15, 2005.
4. One final item that also contributed to the delay: Merlot was the first small red bean to be released through Michigan State University and as a commercial class there was some uncertainty as to its commercial future in the state. As a result there was no a major push by industry for the seed during the time of its initial release. This again resulted in delays to increase seed for commercial release.

EXHIBIT A-**Origin and Breeding History:**

- Winter 1994 Original cross 94U079 was made in E. Lansing, MI. Parentage: R94037/R94161. R94037 is derived from a cross between the USDA breeding lines X91511 and X91515. R94161 is derived from a 4-way cross between the USDA breeding lines X91501, X91513, X91504, and X91515. The USDA breeding lines were developed from a complex series of crosses between an upright pinto bean from Michigan State University, U.S. small-red germplasm and Central American small-red germplasm. The F₁ seed were grown and selfed in the spring of 1995 in the greenhouse in E. Lansing, MI.
- Summer 1995 Single plant selection (95L-7048) was made in the F₂ generation in Saginaw, MI on the basis of seed traits and agronomic characteristics.
- Winter 1995 A single F₃ progeny row (96T-6437) was selected and returned to Michigan as F₃ seed.
- Summer 1996 The F₃ seed (96T-6437) was planted in the observation nursery (93T-1059) at Saginaw, MI. Seed from the single-plant selection, 96T-1059-01 was sent to Puerto Rico to be advanced.
- Winter 1996 The F_{4:5} breeding line 96T-1059-01 was grown in a single row in Puerto Rico and advanced to the F_{4:6} generation.
- Summer 1997 The F_{4:6} breeding line was placed in replicated yield trials in Saginaw, MI. Data were collected on yield, seed size, flowering and maturity dates, and plant type. A modified bulk selection procedure was used where 10 uniform plants were selected and the seeds bulked.
- Winter 1998 The F_{4:7} bulked selection was grown in the Puerto Rico winter nursery and advanced to the F_{4:8}.
- Summer 1998 The F_{4:8} population was given the permanent code number R98026 and was placed in replicated yield trials in Saginaw, MI. Data was taken on yield, seed size, height, flowering and maturity dates, and plant type. Canning tests were done during the subsequent winter. Seed was screened for resistance to BCMV (NL-3 strain) and rust (Races 41, 53, and 108).
- Summer 1999-2004 R98026 was yield tested in 29 locations in mid-Michigan for 6 seasons.
- Spring 2002 Based on continued superior performance, **R98026** was released as the named variety **Merlot**. Western breeder seed is available for increase and distribution.

EXHIBIT A- Uniformity and Stability (Cont.)

Uniformity and Stability: Since initially selected, the cultivar MERLOT is uniform and stable within commercially acceptable limits and breeds true to type. MERLOT is maintained through pure-line selection and has been monitored for five generations from the F₈ to F₁₂ generation. During this time, MERLOT has been uniform and stable, with no variants observed.

EXHIBIT B- Statement of Distinctness:

Distinctness: MERLOT is most similar to the small-red bean variety Rufus. Merlot differs from Rufus in having an upright indeterminant type II growth habit (Singh, 1982), whereas Rufus has a type III growth habit. Merlot carries the *Ur-3* rust resistance gene, which conditions resistance to rust races 41, 53, and 108 to which Rufus is susceptible, as it does not carry the *Ur-3* gene.

Reference: Singh, S.P. 1982. A key for identification of different growth habits of *Phaseolus vulgaris* L. Annu. Rpt. Bean Improv. Coop. 25:92-95.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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**U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705**

Exhibit C

**OBJECTIVE DESCRIPTION OF VARIETY
Field Bean (*Phaseolus vulgaris* L.)**

NAME OF APPLICANT (S) Michigan State University	TEMPORARY OR EXPERIMENTAL DESIGNATION R98026	VARIETY NAME Merlot
ADDRESS (Street and No. or RD No., City, State, Zip Code, and Country) Michigan State University Office of Intellectual Property 246 Administration Bldg. East Lansing, MI 48824		FOR OFFICIAL USE ONLY PVPO NUMBER 200500181

PLEASE READ ALL INSTRUCTIONS CAREFULLY:

Provide data for all characters unless indicated as "optional". Place numbers in the boxes for the characters or numerical values that best describe this variety. Measured data should be the mean of an appropriate number of well spaced (15-20 cm) plants. The Royal Horticultural Society or any recognized color standard may be used to determine plant color. Designate the color system used below.

COLOR SYSTEM USED:

LOCATION OF THE TEST(S) TO EVALUATE THIS VARIETY:

1. MARKET CLASS:

0 6

CLASS

- 1 = Navy (Pea)
- 2 = Small White
- 3 = Black
- 4 = Pinto
- 5 = Great Northern
- 6 = Small Red
- 7 = Pink
- 8 = Cranberry
- 9 = Dark Red Kidney
- 10 = Light Red Kidney
- 11 = Yellow Eye
- 12 = Other (Specify _____)

CHECK

- Seafarer
- Aurora
- Midnight
- UI-114
- UI-59
- NW-59
- Viva
- UI-50
- Montclair
- Redcloud
- Steuben

2 = MATURITY:

2

1 = Early (80-90 days) 2 = Medium (90-100 Days) 3 = Late (> 100 Days)

9 5

Days from Planting to Harvest Maturity

Heat Units from Planting to Harvest Maturity (Optional). Specify Base Temperature Used: _____

98 days Days from Planting to Harvest Maturity of Check Variety (Use Check Appropriate to Market Class Shown in Item 1)

3. PLANT HABIT:

3

TYPE

- 1 = Ia Bush-determinate, Strong and Erect Stem and Branches
- 2 = Ib Bush-determinate, Weak Stem and Branches
- 3 = IIa Erect Growth Habit-indeterminate, Guides (Runners) short or not developed
- 4 = IIb Erect Growth Habit-indeterminate, Guides Medium to Long, with no Ability to Climb
- 5 = IIIa Vine-indeterminate, Short Guides with no ability to Climb
- 6 = IIb Vine-indeterminate, Long Guides with Ability to Climb
- 7 = IVa Indeterminate Climbing, Pods Distributed Throughout the Plant
- 8 = IVb Indeterminate Climbing, Pods Concentrated on the Upper Part of the Plant

49 cm Average Height of Mature Plant, in cm.

35 cm Average Height of Check Variety, in cm.
(Use Same Check as Above)

3

Pod Position: 1 = Low (Lower Pods Touching Soil Surface)
2 = High (Lower Pods not Touching Soil Surface)
3 = Scattered (Not Concentrated High or Low)

1

Adaptability to Machine Harvest: 1 = Adapted 2 = Not Adapted

1

Lodging Resistance: 1 = Good 2 = Fair 3 = Poor

4. LEAFLET MORPHOLOGY: (Use terminal Leaflet of a Fully Expanded Trifoliolate)

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☐ 1 = Smooth 2 = Wrinkled ☐ 1 = Dull 2 = Glossy 3 = Semiglossy 4 = Variable

Shape:

1 = Ovate

2 = Lanceolate

3 = Deltoid

4 = Cordate

5 = Rhomboid

☐ 1

Apex of Leaflet:

1 = Acute

2 = Acuminate

3 = Cuspidate

4 = Obtuse

2



Base of Leaflet:

1 = Obtuse

2 = Oblique

3 = Cordate

4 = Cuneate

5 = Attenuate

☐ 1

5. FLOWER COLOR AND DAYS TO BLOOM:

☐ 1 Color of Standard: 1 = White 2 = Cream 3 = Pink
 4 = Blue 5 = Purple

☐ 3 Color of Keel: 1 = White 2 = Cream 3 = Pink
 4 = Blue 5 = Purple

☐ 1 Color of Wings: 1 = White 2 = Cream 3 = Pink
 4 = Blue 5 = Purple

45 days Days to 50% Bloom

6. POD MORPHOLOGY: (Green Pod Morphology Optional)

Green Mature

☐ ☐ 3 Color Pattern: 1 = Solid 2 = Striped 3 = Blotched 4 = Mottled 5 = Other _____

☐ ☐ 5 Primary Color: 1 = Purple 2 = Red 3 = Green 4 = Yellow 5 = Tan 6 = Brown 7 = Other _____

☐ ☐ 3 Color Modifier: 1 = Light 2 = Light Medium 3 = Medium 4 = Medium Dark 5 = Dark

☐ ☐ 1 Secondary Color: 1 = Purple 2 = Red 3 = Green 4 = Yellow 5 = Tan 6 = Brown 7 = Other _____

☐ ☐ 3 Cross Section Shape: 1 = Flat 2 = Pear 3 = Round 4 = Figure Eight

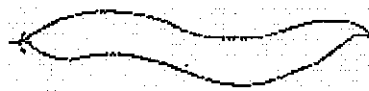
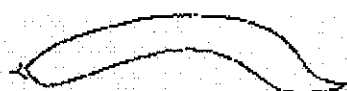


☐ ☐ 2 Pod Curvature: 1 = Straight 2 = Slightly Curved

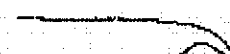
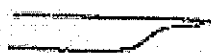


3 = Curved

4 = Recurved



☐ ☐ 3 Pod Beak Orientation: 1 = Straight 2 = Curved Upward 3 = Curved Downward



4 = Variable
Average Beak Length,
in cm. _____

☐ ☐ 3 Constrictions: 1 = None 2 = Slight 3 = Deep


☐ 5 • ☐ 0 Average Number of Seeds per Pod

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7. SEED COLOR:

☐ 3 1 = Shiny 2 = Dull 3 = Semi-shiny 4 = Variable ☐ 1 1 = Monochrome 2 = Polychrome
☐ 7 Primary Color: 1 = White 2 = Yellow 3 = Buff 4 = Tan 5 = Brown 6 = Pink 7 = Red 8 = Purple 9 = Blue 10 = Black 11 = Other ☐ Secondary Color: 1 = White 2 = Yellow 3 = Buff 4 = Tan 5 = Brown 6 = Pink 7 = Red 8 = Purple 9 = Blue 10 = Black 11 = Other
☐ 1 Color Pattern: 1 = Solid 2 = Splashed 3 = Mottled 4 = Striped 5 = Flecked 6 = Dotted ☐ 2 Hilar Ring: 1 = Absent 2 = Present
☐ 10 Hilar Ring Color: 1 = White 2 = Yellow 3 = Buff 4 = Tan 5 = Brown 6 = Pink 7 = Red 8 = Purple 9 = Blue 10 = Black 11 = Other

8. SEED SHAPE AND WEIGHT:

☐ 2 Shape of Seed Taken From Middle of Pod: 1 = Round 2 = Oval 3 = Cuboid 4 = Kidney 5 = Truncate Fastigate

☐ 37 Dry Seed Weight in g/100g Seeds (Adjusted to 12% Moisture)

9. ANTHOCYANIN PIGMENTATION:

1 = Absent 2 = Present
☐ 1 Flowers ☐ 1 Stems ☐ 2 Pods ☐ 1 Seeds
☐ 2 Leaves ☐ 1 Petioles ☐ 1 Peduncles ☐ 1 Nodes

10. KNOWN DISEASE REACTION:

DISEASES – COMMON NAME: Anthracnose, Rust, Powdery Mildew, Fusarium Root Rot, Pythium Root Rot, Rhizoctonia Root Rot, Pythium Wilt, Sclerotinia White Mold, angular Leaf Spot, Bacterial Wilt, Halo Blight, Fuscous Blight, Common Bacterial Blight, Red Node Virus, Pod Mottle Virus, Bean Common Mosaic Virus, Bean Yellow Mosaic Virus, Curly Top Virus, Bacterial Brown Spot, Bean Southern Mosaic Virus, Other (Specify) _____

Reaction: 1 = Susceptible 2 = Resistant 3 = Tolerant 4 = Avoidance

(Give the Common Name (CN), Scientific Name (SN), and Race(s), Where Applicable)

2 Disease: CN Rust; SN Uromyces appendiculatus; Race(s) 41, 53, 108
 2 Disease: CN Bean Common Mosaic Virus; SN BCMV; Race(s) NL-1, NL-2, NL-7
 1 Disease: CN Common Bacterial Blight; SN Xanthomonas campestris; Race(s) Michigan isolates
☐ Disease: CN _____; SN _____; Race(s) _____
☐ Disease: CN _____; SN _____; Race(s) _____
☐ Disease: CN _____; SN _____; Race(s) _____

11. KNOWN INSECT/NEMATODE RESISTANCE:

PESTS – COMMON NAME: Aphids, Bean Pod Weevil, Bruchid Beetle, Corn Earworm, Flea Beetle, Leaf Hopper, Lesion Nematode, Lygus, Mexican Bean Beetle, Root Knot Nematode, Corn Seed Maggot, Spider Mites, Thrips, Weevils, Western Bean Cutworm, Other (Specify) _____

Reaction: 1 = Susceptible 2 = Resistant 3 = Tolerant 4 = Avoidance

(Give the Common Name (CN), Scientific Name (SN), and Race(s), Where Applicable)

☐ Pest: CN _____; SN _____; Race(s) _____
☐ Pest: CN _____; SN _____; Race(s) _____
☐ Pest: CN _____; SN _____; Race(s) _____

12. KNOWN PHYSIOLOGICAL STRESS REACTION:

1 = Susceptible 2 = Resistant 3 = Tolerant 4 = Avoidance
☐ Heat ☐ Cold ☐ Drought ☐ Air Pollution

200500181

13. COMMENTS:

Merlot carries the bc-l² gene for resistance to bean common mosaic virus and Ur-3 for resistance to bean rust races 41, 53, and 108.

20 of the 23 maternal clones and sent to Advanta Seeds Pacific, Inc. Approximately 95% of this seed contained a *Neotyphodium* spp. endophyte. This seed was used to establish an experimental Foundation seed increase field during the fall of 1999 and was also entered in the 1999 National Turfgrass Evaluation Program (NTEP) perennial ryegrass test (Morris, 2000).

Applaud is a medium-late maturing, low-growing, turf-type perennial ryegrass, with an attractive dark-green color, fine leaf texture, and medium-high shoot density (Morris, 2000; Morris, 2001). It showed excellent overall turf performance in NTEP trials under various maintenance regimes. Applaud also exhibited good resistance to crown rust disease and good resistance to leaf spot (caused by *Drechslera siccans* Drechs.), stem rust (caused by *P. graminis* Pers.:Pers.), red thread [caused by *Laetisaria fuciformis* (McAlpine)], and dollar spot [caused by *Sclerotinia homoeocarpa* (F.T. Bennet)] in NTEP trials (Morris, 2000; Morris, 2001). Applaud shows promise for excellent turf performance on home lawns, athletic fields, and golf course fairways throughout regions where perennial ryegrass is well adapted.

Seed production of Applaud is limited to one generation of Foundation and two generations of Certified seed. U.S. Plant Variety Protection for Applaud has been applied for (PVP Application no. 200200259). Breeder seed is maintained by Pennington Seed Co.

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Acknowledgments

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S.A. Bonos, D. Smith, W.A. Meyer, and C.R. Funk, Dep. of Plant Biology and Pathology, Cook College, Rutgers Univ., 59 Dudley Rd., Foran Hall, New Brunswick, NJ 08901; K. Hignight, Advanta Seeds Pacific, 33725 Columbus St. SE, P.O. Box 1496, Albany, OR 97321-0452; R. Stapp, Pennington Seed Co., P.O. Box 290, Madison, GA 30650. Publication No. 12180-2-03. Some of this work was conducted as part of the NJAES Project no. 12180, supported by NJAES funds, other grants and gifts. Additional support was received from the U.S. Golf Association-Golf Course Superintendents Association of America Research Fund, and the New Jersey Turfgrass Association. Registration by CSSA. Accepted 30 June 2003. *Corresponding author (bonos@aesop.rutgers.edu).

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Registration of 'Merlot' Small Red Bean

'Merlot' small red dry bean (*Phaseolus vulgaris* L.) (Reg. no. CV-211, PI 633423) was developed and released cooperatively by the USDA-ARS and the Michigan Agricultural Experiment Station in 2002 as an upright, short vine (Type IIA), full-season maturity, disease resistant cultivar. Merlot's unique features are that it is the first small red commercial cultivar with resistance to bean rust disease [caused by *Uromyces appendiculatus* (Pers.:Pers.) Unger], with a robust upright vegetative growth appearance, and consistent and desirable canning quality.

Merlot, tested as breeding line no. ARS-R98026, was derived from a cross made in 1994 between breeding lines ARS-R94037 and ARS-R94161. Both parents had the upright indeterminate Type IIA growth habit (Singh, 1982) and were full-season breeding lines. ARS-R94037 had a seed weight of 40 g 100 seeds⁻¹, yielded 3476 kg ha⁻¹ in the 1994 yield trial, and displayed acceptable canning quality. ARS-R94161 showed field resistance to bean rust. The F₁ plants were advanced in the greenhouse and space-planted in an F₂ nursery at the Saginaw Valley Bean and Sugar Beet Research Farm near Saginaw, MI. In 1996, a single plant was selected from an F₄ row on the basis of desired agronomic performance and small red seed traits and advanced as a single row in a nursery in Puerto Rico. The F_{4.6} (Michigan) and F_{4.7} (Puerto Rico) progenies were handled as bulk populations. In 1998, the F_{4.8} breeding line coded ARS-R98026 was entered into replicated yield trials.

Merlot was tested at 18 locations in the mid-Michigan bean production area over five seasons (1998-2002) and at Othello, WA (2002) and compared with the following small red cultivars: 'Brooks', 'Rufus', 'UI239', 'NW63', and 'Garnet'. Over the 19 locations Merlot averaged 2773 kg ha⁻¹. Merlot's yield advantage was 3% over the Type IIA cultivar, Brooks, and 6, 7, 10, and 23% over the prostrate, Type III cultivars: Rufus, UI239, NW63, and Garnet, respectively.

Plants of Merlot averaged 47 cm tall and exhibited a narrow profile architecture (Adams, 1982). These features combined with the Type IIA growth habit gave the cultivar superior lodging resistance compared to the Type III checks. Merlot has white flowers and blooms 45 d after planting. Merlot matures 93 d after planting and ranges from 87 to 100 d depending on the season, thus, making it a mid- to full-season maturing bean. Merlot matures and dries-down uniformly and has an appealing straw-yellow appearance at harvest maturity.

Dry seed of Merlot has the garnet color and noticeable hilum ring typical for small red beans. However, Merlot has a greater intensity of color than check cultivars giving the dry seed a highly appealing appearance. Intensity of color was determined by the hue angle criterion (Hosfield et al., 1995). The intensity of Merlot's dry seed color carries over to the canned product. The hue angle for Merlot was 34.5 compared to 36.0, 36.8, 37.7, and 39.4 for Garnet, Brooks, UI239, and NW63, respectively (the closer to 0°, the more intense red). Individual seed are oval, approximately 1.2 by 0.8 cm in length and width, plump at the surface tangential to the hilum and gently rounded at the apices, giving Merlot a more attractive shape than the rhomboid-like seeds of the checks. At the eight locations in which seed mass data were taken, Merlot averaged 39.2 g 100⁻¹ seed and ranged from 37.5 g to 39.8 g 100⁻¹ seed. Merlot's seed mass was significantly greater than the commercial check cultivars at those locations where comparisons were made.

Merlot was tested for its aggregate canning quality, which reflects consumer and processor preferences, in the Michigan State University Pilot Processing Laboratory (Dep. of Food Science and Human Nutrition). A team of panelists subjectively rated Merlot as having desirable canning quality. Merlot scored 5.0 for visual appeal (Walters et al., 1997) on a seven-point hedonic scale (where seven is most desirable, one least desirable, and four, neither desirable nor undesirable). This evaluation is based on whole bean integrity (the perception of clumping and splitting in the can), uniformity of size of individual grains (uniform water uptake), and clarity and viscosity of the canning medium (a measure of starch exudation into the brine). Compared with Merlot, the visual appeal scores for Brooks, NW63, UI239, Garnet, and Rufus were 2.8,

3.2, 3.8, 4.4, and 5.9, respectively. The human eye can detect a one point difference in visual appeal (Hosfield, unpublished). After it is processed, Merlot is similar to the checks for hydration and washed drained weight ratios (Wassimi et al., 1990).

Merlot's cooked bean kinesthetic properties (texture and mouth feel) is desirable for the small red market class. Kinesthetic properties of cooked beans were measured with an Allo-Kramer Shear Press and indicated that Merlot was significantly firmer than NW63 and UI239, which were judged soft and marginally satisfactory. The kinesthetic properties of Merlot are equivalent to Brooks, Rufus, and Garnet.

Merlot carries the *bc-1²* gene for resistance to bean common mosaic virus and the *Ur-3* gene for resistance to Race 53 and all indigenous races of *U. appendiculatus* prevalent in Michigan. The recessive *bc-1²* resistance gene protects plants against systemic infection caused by *Beancommon mosaic virus* (BCMV) from pathogroups I, II, III, and IV of the virus. The *bc-1²* gene is thought to condition tolerance to the NL-3 strain of bean *Common mosaic necrosis virus* (BCMNV) (Strausbaugh et al., 1999). Merlot is susceptible to bean anthracnose [caused by *Colletotrichum lindemuthianum* (Sacc. & Magnus) Lams.-Scrib.].

Variety protection for Merlot has been applied for under the U.S. Plant Variety Protection Act with the option that the cultivar may be sold for seed by name only as a class of Certified seed. Breeder and Foundation seed will be maintained by the Michigan Crop Improvement Association, East Lansing, Michigan. A royalty will be collected on each unit of Foundation seed sold.

G.L. HOSFIELD,* G.V. VARNER,
M.A. UEBERSAX, AND J.D. KELLY

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G.L. Hosfield, Sugar Beet and Bean Research, USDA-ARS, East Lansing, MI 48824; J.D. Kelly and M.A. Uebersax, Department of Crop and Soil Sciences and Department of Food Science and Human Nutrition, respectively, Michigan State Univ., East Lansing; G.V. Varner, Mich. Dry Bean Production Res. Adv. Board, 3066 S. Thomas Rd., Saginaw, MI 48603. Joint contribution from the USDA-ARS and Michigan Agric. Exp. Stn. Registration by CSSA. Accepted 30 June 2003. *Corresponding author (hosfiel2@msu.edu).

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Registration of 'Cariblanco N' Lima Bean

'Cariblanco N' (*Phaseolus lunatus* L.) (Reg. no. CV-212, PI 632361) was developed by the University of California, Davis (UCD) and Riverside (UCR) and released by the California Agricultural Experiment Station in 2001. Cariblanco N

is an indeterminate, vine type, small seeded or "baby" Lima bean that has resistance to root-knot nematodes [*Meloidogyne incognita* (Kofoid and White) Chitwood and *M. javanica* (Treub) Chitwood]. Cariblanco N was evaluated in performance trials in California from 1994 through 1998 under the designation V-8.

Cariblanco N was developed from a single plant selection (9399-6) made in 1993 from progeny derived from a cross between UCD Selection-144 and UCD Accession L-136 made in 1989. L-136 originated in Puerto Rico (Allard, 1954) and carries an introduced source of root-knot nematode resistance for baby Limas (Allard, 1954; McGuire et al., 1961). L-136 has an indeterminate growth habit, bright red seed, and very late maturity. Selection-144 is root-knot nematode susceptible, has a determinate (bush) growth habit, matures in about 110 d and during the growing season, it is similar in appearance to commercial cultivars Henderson Bush (PI 549466) and UC-Luna. Selection-144 was derived from a cross between commercial cultivars Bridgeton (PI 549508) and Mezcla (PI 549505), selected at F₂ and F₃ for white seed coat, white cotyledon, determinate bush type, and maturity. Selection-144 was one of several F₄ families bulked from a total of 215 F₃ progeny rows. Selection-144 has small flat white seeds similar in appearance to those of commercial bush cultivars Henderson Bush and UC-Luna.

The F₁ from the Selection-144 × Accession L-136 cross produced 411 F₂ seeds from which individual plants were field selected for vine and bush type and white seed. The F₃ seed from these single plants were planted in progeny rows at field sites infested with the root-knot nematodes to select lines with dual resistance. In 1993 and 1994, agronomic traits were selected by means of F₃ reserve seed from nematode resistant families. Individual seeds were planted in the greenhouse and the plants were evaluated for morphological traits, seed coat and cotyledon color, and seed quality (shape, size, and eye pattern). F₄ seed was harvested from individual F₃ plants. The F₄ seed was then split between a controlled greenhouse pot test used to assess resistance to both *M. incognita* and *M. javanica*, and a seed increase planted in the 1994 Davis field nursery. On the basis of nematode resistance data, F₅ seed was bulk-harvested from F₄ families. For F₄ families that continued to segregate for nematode resistance, F₅ seed from single plants was harvested to reselect homozygous resistance to *M. incognita* and *M. javanica*. The F₅ vine families that demonstrated consistent resistance reactions to both nematode species were advanced to multilocation yield tests in commercial fields during 1995, and thereafter increased and retested through 2000 to confirm fixed nematode resistance. V-8 was the best-performing nematode resistant family.

No current California cultivars of baby Lima beans carry resistance to the common root-knot nematodes *M. incognita* and *M. javanica*, or to other root-knot species. The large-seeded Lima bean cultivars Maria, UC 92, and White Ventura N carry resistance to *M. incognita* but not to *M. javanica* (Anonymous, 1979; Temple and Helms, 1992; Tucker, 1969). Cariblanco N carries resistance genes from the L-136 parent that suppress both reproduction and root-galling by *M. incognita* and root-galling but not reproduction by *M. javanica*. Genetic analysis and segregation of the resistance at various generations during breeding of Cariblanco N suggested that three nonallelic genes confer the three resistance traits (resistance to *M. incognita* reproduction, to *M. incognita* galling, and to *M. javanica* galling) independently (Roberts and Matthews, unpublished data). Reproduction of *M. incognita* on Cariblanco N measured by eggs per gram of root and per root system in controlled, replicated greenhouse pot tests averaged about 10% of that produced on susceptible Henderson Bush

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S) Michigan State University and United States Department Agriculture	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER R98026	3. VARIETY NAME Merlot
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) Michigan State University Office of Intellectual Property 246 Administration Bldg. East Lansing, MI 48824	5. TELEPHONE (Include area code) (517) 355-2186	6. FAX (Include area code) (517) 432-3880
7. PVPO NUMBER 200500181		

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain. ☐ YES ☒ NO

"Merlot" is jointly owned by Michigan State University (MSU) and United States Department of Agriculture.

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country. ☒ YES ☐ NO

10. Is the applicant the original owner? ☒ YES ☐ NO If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐ YES ☐ NO If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐ YES ☐ NO If no, give name of country

11. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

"Merlot" is a small red dry-bean variety selected from crosses made by a breeder from the United States Department of Agriculture and a breeder from Michigan State University. The United States Department of Agriculture and Michigan State University breeders acted together to develop the variety. The crosses were made, selected, and tested at Michigan State University. No other party has ownership rights to the variety.

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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